1/45

DJGIZHLL CICT

2/45

DGG12444.C3GSC

Inventors: L.R. Dalton et al. Application No.: 09/912,444
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Fig.2A.

Fig.2B.

$$\begin{array}{c|c} HO \\ \\ N \end{array} \begin{array}{c} Si \\ \\ O \end{array} \begin{array}{c} F \\ \\ F \end{array} \begin{array}{c} F \\ \\ CN \end{array}$$

Fig.2C.

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Fig.2E.

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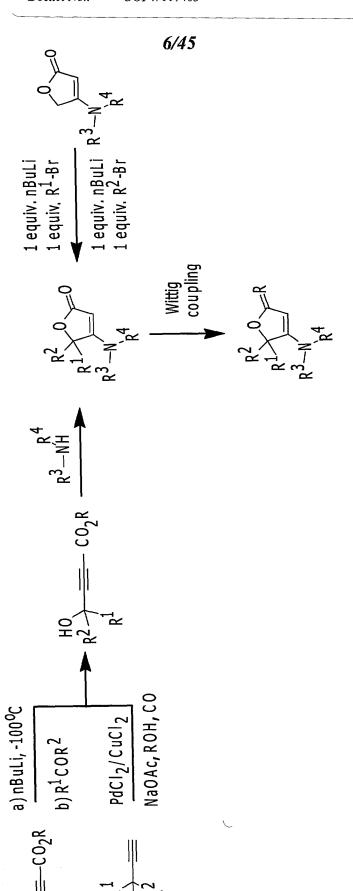
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5/45 HO. $\text{C}\dot{\text{F}}_3$ НО Fig.2F.

Fig. 2G.
$$F_3 C F$$
 $F_3 C F$ $F_4 C F_3$

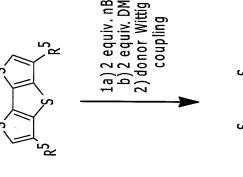
Fig. 2H.
$$F = F = F_3 C = NC$$



| S R 6 S C H 0 | donor Wittig coupling | 7/45 B B B B B B B B B B B B B | |
|--|-----------------------|---|--|
| R ₅ | | 1) nBuLi 2) DMF | |
| S R 6 1) nBuLi | | OHC S R6 | |
| 1) 1 equiv. R ³ MgX Ni(acac) ₂ 2) 1 equiv. R ⁶ MgX Ni(acac) | 14(acac) ₂ | acceptor Condensation | |
| S Br | | R S S R 6 | |

DSSIZ+++.czcsoz





equiv.
$$R^6 M g X$$

Ni(acac)₂

acceptor coupling OHC S

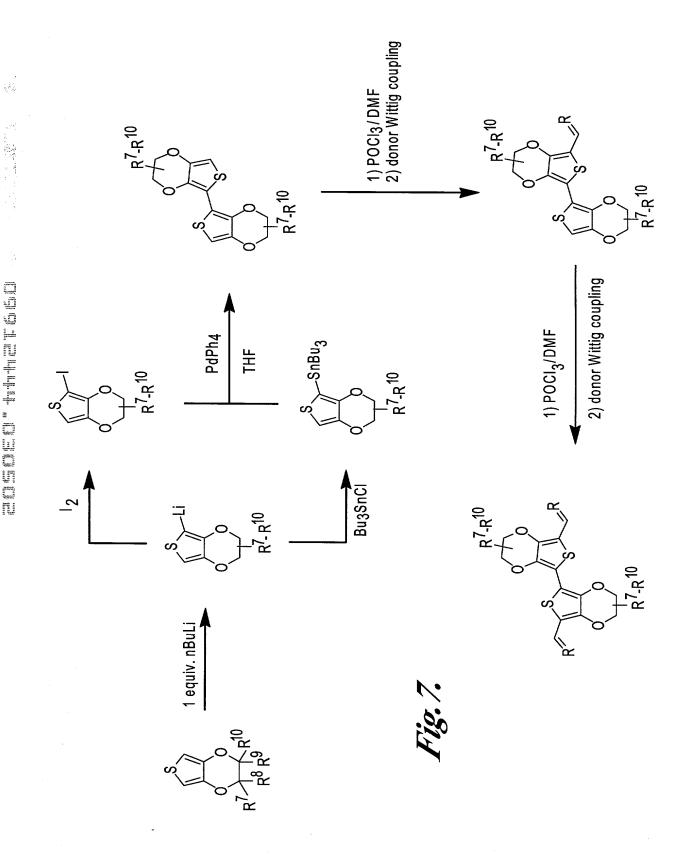
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Fig. 8.

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OMe

2

OMe

3

Fig. 9.

CH₂PPh₃Br

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$$0 \longrightarrow 0 \xrightarrow{2.1 \text{ equiv n-BuLi}} \xrightarrow{\text{DMF}} \xrightarrow{\text{H}^{+}/\text{H}_{2}\text{O}} \xrightarrow{\text{OHC}} \xrightarrow{\text{S}} \xrightarrow{\text{CHO}}$$

Fig. 10.

$$H_3C$$
 CH_3
 CH_3

Fig.11.

Fig. 13.

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Fig. 12.

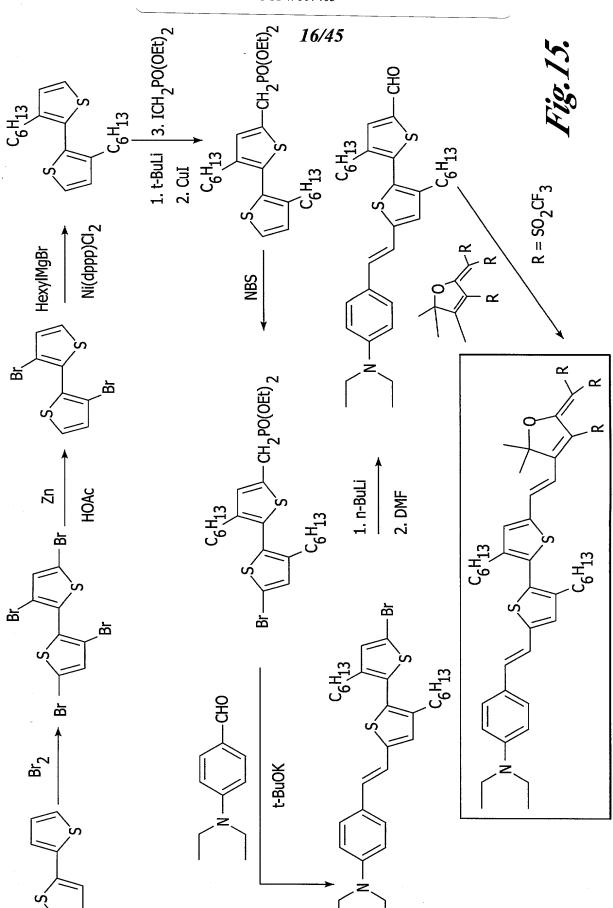
1991244. OZOSOZ

Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES
Inventors: L.R. Dalton et al.
Application No.: 09/912,444
Docket No.: UOFW117403

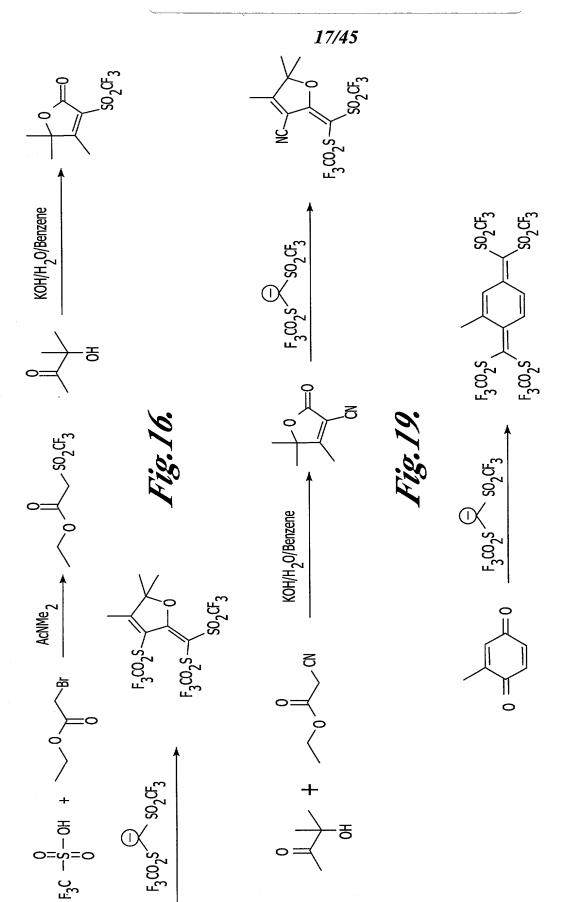
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Fig.14.

EGGTELL CZOSC



19912444.CICSOE



Inventors:

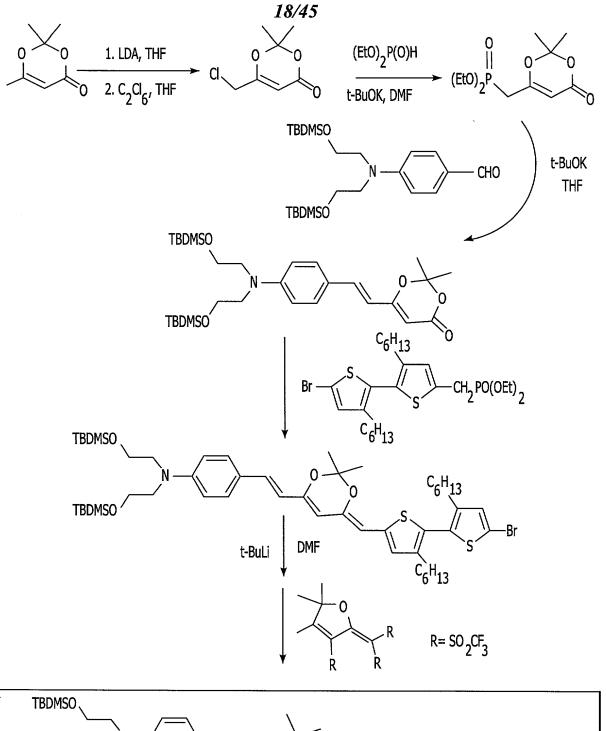
L.R. Dalton et al.

Application No.: 09/912,444

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Docket No.:

0991E444.026562



TBDMSO
$$\begin{array}{c} & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ &$$

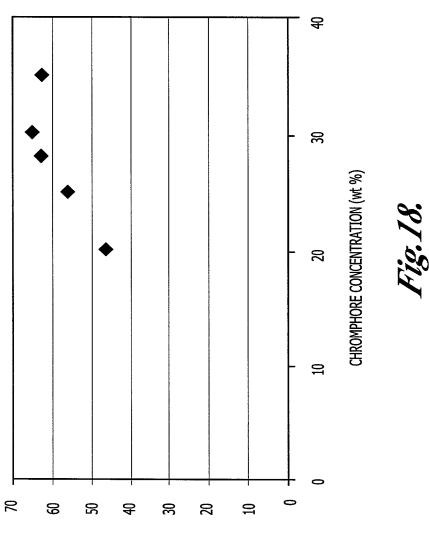
Fig.17.

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Titlė: HYPERPOLARIZABLE ORGANIC CHROMOPHORES

Inventors: L.R. Dalton et al. Application No.: 09/912,444
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EO COEFFICIENT (pm / V at 1.3 microns)

20/45

D991E444.CECE

DOGIETH CZOSOZ

21/45 ΗQ HÓ CN НО NĆ

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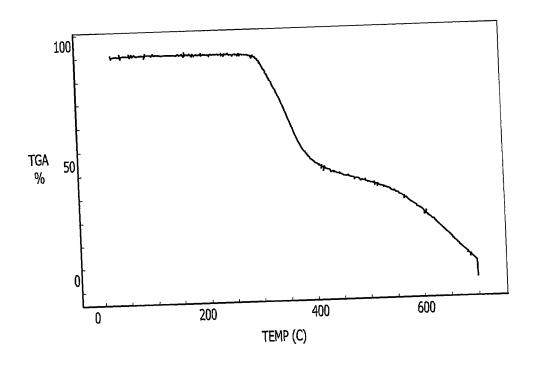
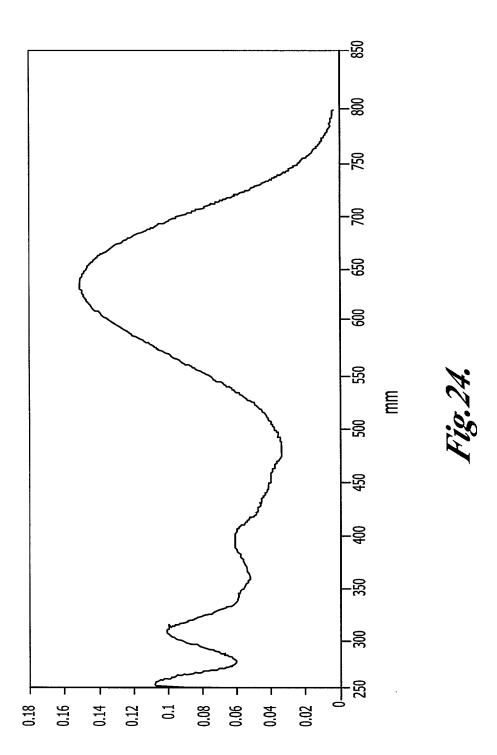


Fig.23.

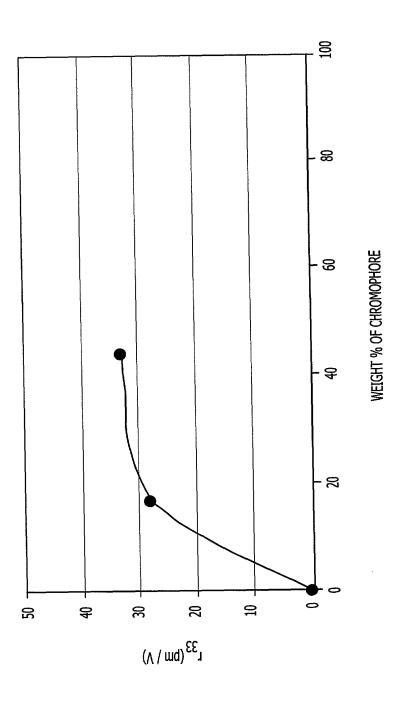
Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES
Inventors: L.R. Dalton et al.
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19912444 CIOSOE

Inventors: L.R. Dalton et al. Application No.: 09/912,444

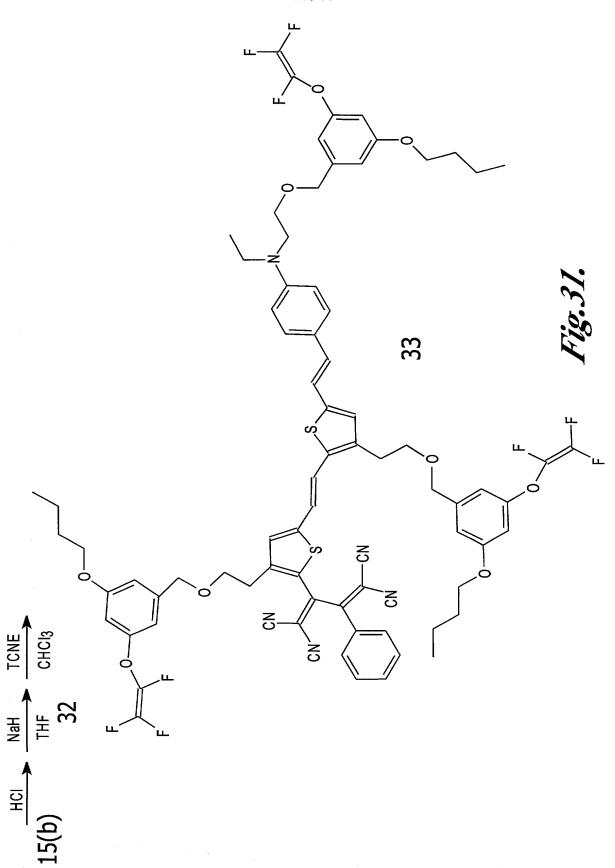
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27/45 НО QН ·OH 15(a) HCI→ 24 HÓ NaH THF 18 Dend Dend Dend 25 `Dend Tetracyanoethylene CHCI₃ Dend = αN CN² άN 26

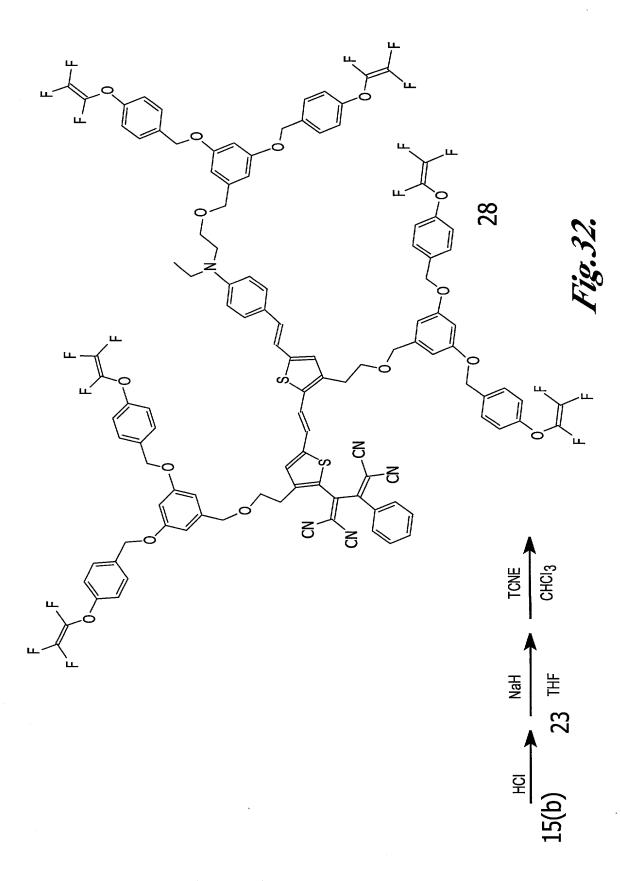
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Title: HYPERPOLARIZABLE ORGANIC CHROMOPHORES
Inventors: L.R. Dalton et al.
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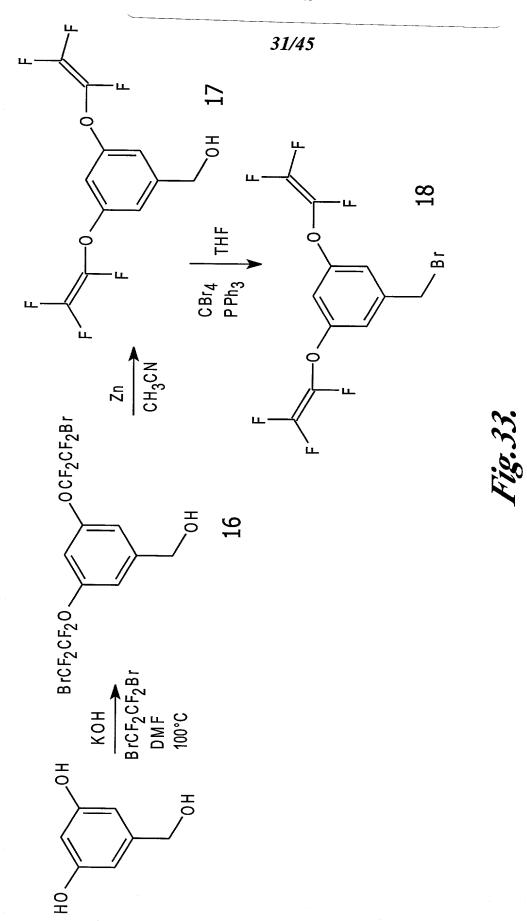
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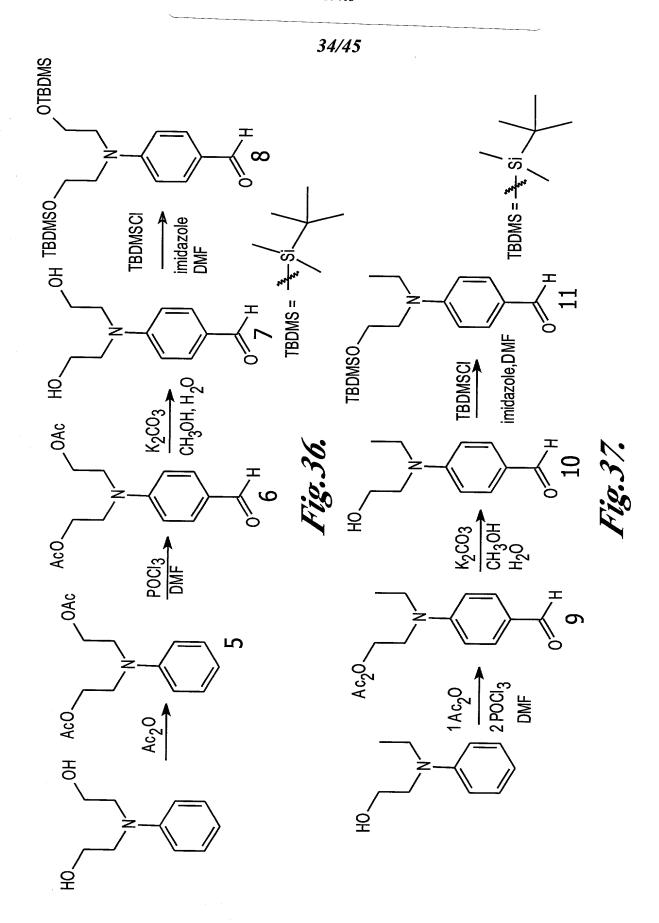
Title; HYPERPOLARIZABLE ORGANIC CHROMOPHORES
Inventors: L.R. Dalton et al.
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33/45 OH O 30 31 BrCF2CF20~ KO KO CBr4 PPh3 29 32 HO. HO

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DEGIETH CICEDE

Inventors: L.R. Dalton et al. Application No.: 09/912,444
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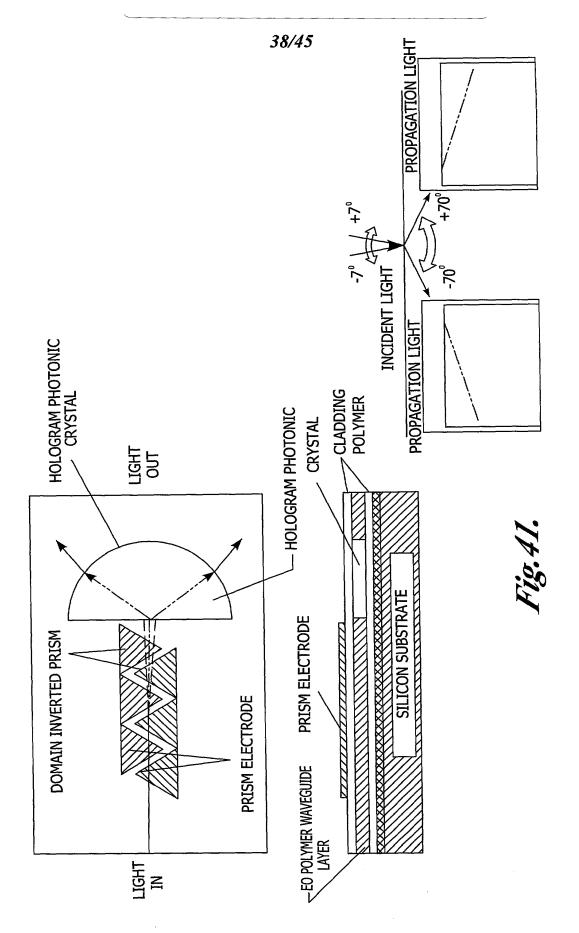
Fig.39.

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a R = OTBDMSbR = H

Fig. 40.

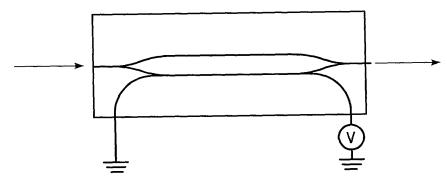
Title: HYPERPOLARIZABLE ORGANIÇ CHROMOPHORES Inventors: L.R. Dalton et al.
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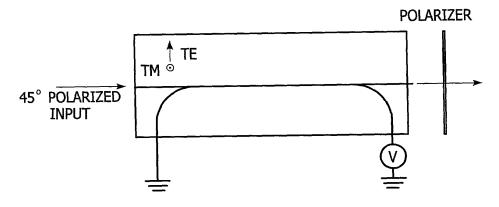
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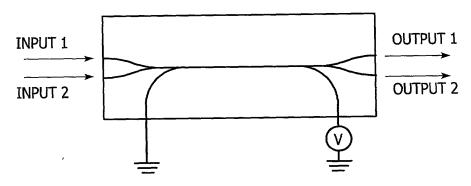
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MACH ZEHNDER MODULATOR



BIREFRINGENT MODULATOR



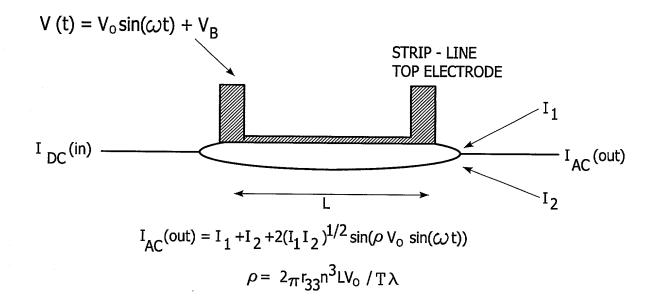
DIRECTIONAL COUPLER

Fig. 42.

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| | COMPARISON OF KEY FEATURES OF SIMPLE DEVICES | | | |
|------------------|--|----------------------------------|----------------------------|--|
| | MACH ZEHNDER INTERFEROMETER | BIREFRINGENT MODULATOR | DIRECTIONAL COUPLER | |
| | | | | |
| r _{eff} | ^r 33 | ^r 33 ^{-r} 13 | r ₃₃ | |
| V_{π} | v_{\piMZ} | 1.5 V $_{\pi 	extsf{MZ}}$ | 1.73 V $_{\pi 	extsf{MZ}}$ | |
| Mod. Power | P _{MZ} | 2.75 P _{MZ} | ^{3 P} MZ | |

Fig. 43.

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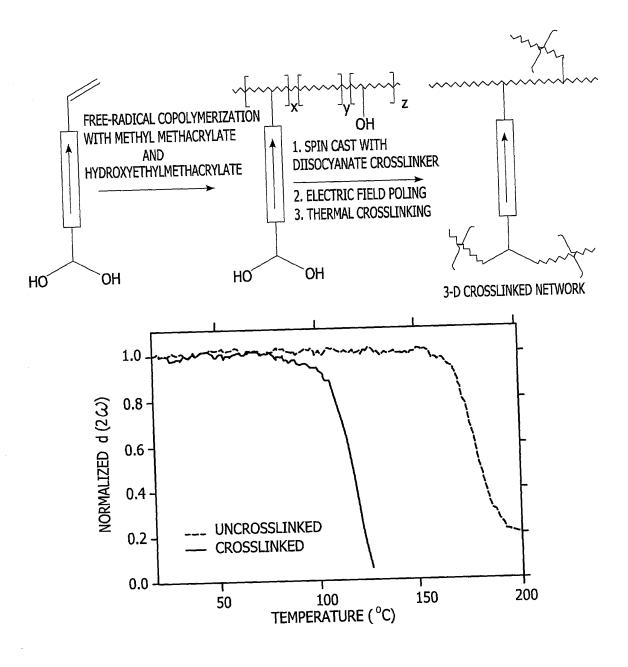


Fig. 44.

42/45 NaOEt **EtOH** CHO PPh3Br W 1.tBuLi 2.DMF СНО W X ÇN piperidine chloroform СНО X .CN

Fig. 45.

СИ

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Fig. 46.

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45/45 OН K₂CO₃ 18-Crown-6 Acetone Α В tBuLi (MeO)₃B C В H0_ `OH Pd(PPh₃)4 2MK₂CÕ₃ DMF C2 D но `OH

C